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OF THE

MASSACHUSETTS ASSOCIATION

OF

BOARDS OF HEALTH

An Official Quarterly Record of
Information for the Public

OCTOBER, 1899

Proceedings of the July Quarterly Meeting

Subject: The Incubation and Infective Periods of Some of the Infectious Diseases

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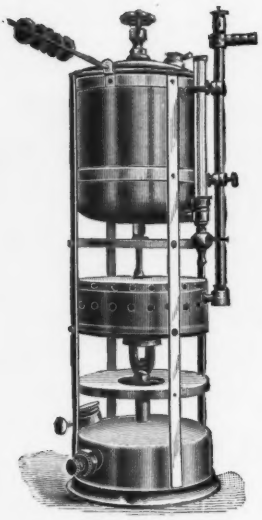

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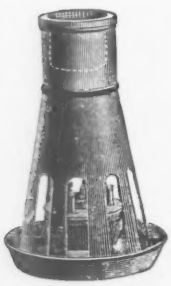

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THE MASSACHUSETTS ASSOCIATION OF BOARDS OF HEALTH was organized in Boston in March, 1890, with the following objects: the advancement of sanitary science in the Commonwealth of Massachusetts; the promotion of better organization and co-operation in the local Boards of Health; the uniform enforcement of sanitary laws and regulations; and the establishment of pleasant social relations among the members of the Association.

All persons holding appointments as members of a Board of Health in a Massachusetts city or town, the executive officers of such a local board, and the members of the State Board of Health are eligible to membership. Other persons may be elected members by vote of the Association. The annual dues are one dollar and fifty cents, and should be paid to the Treasurer, James B. Field, M.D., 329 Westford Street, Lowell, Mass.

The Association holds four regular meetings each year, the annual or January meeting always being held in Boston.

THE OFFICIAL JOURNAL OF THE ASSOCIATION is a quarterly publication, containing the papers read at the meetings, together with verbatim reports of the discussions following them. No part of this matter is printed in any other periodical.

The JOURNAL will present, from quarter to quarter, a fair and adequate picture of the progress of practical sanitary science as applied to the needs of a modern community. The various subjects which are reviewed in the quarterly meetings of the Association are treated by experts qualified to speak from daily experience in Public Health offices, who, as men of science, are careful to be scientific and comprehensive, and who, as public officers, are no less careful to speak pertinently and so as to be easily intelligible to the layman.

The JOURNAL, in a word, appeals to all whose interests touch the questions of sanitation and hygiene,— to the architect, the school-committee-man, the manufacturer, the contractor, and, above all, to the busy practitioner who has no time for any reading but what is brief and to the point.

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All communications to the Association should be addressed to the Secretary, **EDWIN FARNHAM, M.D., City Hall, Cambridge, Mass.**

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JOURNAL OF THE

MASSACHUSETTS ASSOCIATION OF BOARDS OF HEALTH.

ORGANIZED 1890.

[The Association as a body is not responsible for statements or opinions of any of its members.]

VOL. IX. October, 1899. No. 3.

JULY MEETING

OF THE

Massachusetts Association of Boards of Health.

The quarterly meeting of the Association was held at Gallop's Island, Boston Harbor, on the afternoon of July 27, 1899, the President of the Association in the chair. Following is a report of the proceedings.

THE PRESIDENT.—The first business is the consideration of the following names presented as candidates for membership in this Association: —

SILAS H. AYER, M.D.	Boston.
JOHN F. WORCESTER, M.D.	Clinton.
HARRY A. STONE	Newton.
H. D. CHADWICK, M.D.	Waltham.
GEORGE S. FULLER, D.V.S.	Lawrence.
W. F. HARBACH	Newton.
HERBERT C. EMERSON, M.D.	Springfield.
H. L. COOPER	Weston.
GEORGE ABERCROMBIE	Weston.

Is it your pleasure that these gentlemen be elected members of this Association? If so, you will signify it by saying ay: contrary-minded, no; and they are duly elected.

As to the next place of meeting of the Association, a very strong

representation has been made in favor of a meeting at Leominster. What is the feeling of the Association with regard to that location?

DR. DURGIN.—I move the meeting be held in Leominster in October.

The motion was seconded and adopted.

THE PRESIDENT.—Two other names have been presented by the Executive Committee for membership in the Association, H. L. Cooper and George Abercrombie, of Weston. Is it your pleasure that these gentlemen be elected to membership?

The two gentlemen named were elected to membership in the Association.

THE PRESIDENT.—Is there any other incidental business to come before the Association at this time? If not, we will proceed to the regular business of the meeting.

The first paper is upon "The Incubation and Infective Periods of Some of the Infectious Diseases," and the Association is very fortunately going to listen to Dr. Cutler on the subject; and Dr. Cutler I have now the pleasure of introducing to you.

THE INCUBATION AND INFECTIVE PERIODS OF SOME OF THE INFECTIOUS DISEASES.

BY ELBRIDGE G. CUTLER, M.D.

The Incubation Period is the time elapsing between the establishment of the disease in the body, which usually dates from the exposure of a susceptible individual, and the onset of characteristic symptoms. It is liable to variation from the size of the "dose" * of

* Ballard (Report of Committee appointed by Clinical Society of London, 1892, to investigate periods of incubation and contagion of certain contagious diseases) found in one typhoid epidemic 43 cases infected from milk. Of these, 19 used the milk freely as an article of diet, and all but 4 of them applied for medical aid within the first fortnight of the outbreak. 24 of the persons attacked used very little milk; and 17 of these sought medical aid in the third and fourth week of the outbreak, 3 only in the first, and 5 in the second week. Power (same report) records a case where typhoid followed a single draught of infected milk in three weeks, whereas large milk-drinkers in same outbreak suffered early.

the infective agent, its virulence, and the resistance of the individual to its encroachment.*

The incubation period determines the length of time which a susceptible individual who has been exposed to infection should be kept under observation before he can be said to have escaped.

The Period of Isolation is the time during which it is advisable to keep the patient apart from others.

In the preparation of this paper it has been thought worth while to consider only those diseases especially which concern us in this locality; and, as a consequence, Relapsing Fever, Dengue, Asiatic Cholera, and Bubonic Plague have been omitted from consideration.

TYPHOID FEVER.

Incubation.

Murchison concludes as follows: 1. The period of incubation of typhoid fever is most commonly above two weeks; 2. Instances of a longer duration are more common than in typhus or relapsing fever; 3. It is often less than two weeks and may not exceed one or two days.

Liebermeister considers the average period of incubation as three weeks.

Professor Quincke (*Correspondenz-Blatt für schweizer Aerzte*, 1875, No. 8) says, in a series of accurately observed cases, the shortest period was eight days, the longest certain period between sixteen and eighteen days.

In the Marylebone milk epidemic of 1873 a child was taken ill five days after drinking the infected milk (Cayley).

Hilton Fagge says that it has been conjectured that incubation is shorter when the poison is inhaled with the breath, longer when it is swallowed in drinking water.

During this latent period the patient may feel quite well, or, on the

* Chantamesse asserts, on the authority of Dawson Williams, that certain individuals retain for a long time in their intestines, or perhaps even in the substance of their tissues, typhoid germs, which develop ill until the occurrence of some favoring circumstance. A similar retention of the infective agent in a condition of quiescence for long periods is not very infrequent in diphtheria, pneumonia, and suppurative diseases until some general deterioration of health or of the local power of resistance enables it to become established, grow, and produce characteristic effects. Washbourn, Proceedings of the Royal Medical and Chirurgical Society, London. Meeting of Nov. 26, 1895.

other hand, may complain of being out of sorts. There may be languor or tendency to diarrhœa and vague feelings of discomfort and chilliness, with headache and anorexia.

Wilson (American System of Practical Medicine, Loomis, vol. i. p. 179, 1897) says this period is variable. In general, it may be set down as from two to three weeks. In some well-authenticated cases it has not exceeded four or five days. He mentions a case of only four days' incubation.

Williams (Twentieth Century Practice of Medicine, vol. xiii. p. 381) says the determination of the incubation period of typhoid fever has always presented much difficulty, owing to the paucity of cases affording evidence on the point and the difficulty of settling exactly the date at which an attack begins. During the period of incubation the patient is apt to suffer from various ill-defined symptoms, and this condition merges gradually into a developed attack. In other cases, however, the onset of the disease is sudden; and the Report of the Clinical Society, based on analyses of reports of outbreaks down to 1890, has provided a considerable mass of information which is found to confirm the opinions of the best authorities published previously to that date. Their conclusion is: "The interval between exposure to infection and the development of distinct symptoms is probably most often twelve to fourteen days. It is not very infrequently nine or ten days, occasionally eight, and possibly less, In rare cases it is prolonged to fifteen, eighteen, or even twenty-three days." There is some reason to believe that, when the "dose" of the infection is large, the incubation is short. See above notes.

With regard to the Period of Observation, in the majority of instances, in epidemics at least, the infection is derived indirectly from the patient through the medium of water or milk. Experience shows that an epidemic due to contamination of milk with the typhoid bacillus will come to an end at or about the end of the second week after the supply of the infected milk for consumption has been stopped. When water is the distributing medium, a much longer time may elapse before cases cease to appear. Thus, when a public water supply has been contaminated, cases have often continued to occur until the fourth week after the source of the specific pollution has

been removed; and in cases of well-water the length of time is apt to be very much greater, owing probably to the fouling of the soil and the difficulty of insuring thorough disinfection. The period of observation, therefore, is somewhat uncertain; and, if the water supply cannot be entirely changed, it should extend over a month at least.

A patient suffering from typhoid fever is capable of transmitting it to others throughout the entire course of his illness, from the date of the earliest symptoms down to the end of the second week of convalescence at least; and his capability returns during a relapse. Infection can be conveyed by fomites, and retained by them for two months at least. Washerwomen have frequently been infected by washing the linen of patients the nature of whose illness had not been recognized at first, so that no disinfection had been practised. Richardson* found typhoid bacilli in the urine of a number of cases of typhoid. They were apt to appear in the later stages of the disease, and persisted in the great majority of cases far into convalescence.

Brannan (Twentieth Century Practice of Medicine, vol. xvi. p. 615) says the usual duration of incubation period is from eight to fourteen days. In rare instances it may not exceed one or two days. Still more rarely, it may extend three or even four weeks.

Conclusion.

1. The Period of Incubation of Typhoid Fever is most often twelve to fourteen days, frequently nine or ten days, occasionally eight and possibly less. In rare cases it is prolonged to fifteen, eighteen, or even twenty-three days.

2. The Period of Observation is uncertain, and under some circumstances should extend over twenty-eight days; namely, where the water supply cannot be changed.

3. The Period of Isolation, in the ordinary acceptation of the term, should extend through the period of convalescence; and proper disinfection of the stools and urine should be practised for at least a month after the symptoms have ended.

* Bacteriological Studies upon the Urines of Persons Sick with Typhoid Fever. Mark W. Richardson, Massachusetts General Hospital, 1898.

MALARIAL FEVER.

The Period of Incubation most commonly observed is ten to fifteen days, the extremes being probably six and twenty-one days. The shorter the interval between the paroxysms in the fever when it first develops, the shorter also, probably, the period of incubation. Thus, in tertian, it is shorter than in quartan. When induced by injection of malarious blood into healthy persons, the disease has occurred at periods varying from six to sixteen days. (Williams, Twentieth Century Practice of Medicine, vol. xiii. p. 385.)

TYPHUS FEVER.

Incubation.

Moore says, "In typhus fever there seems to be no fixed duration for this stage." In a large number of cases it is about twelve days. It rarely, if ever, exceeds three weeks. (Allbutt's System of Medicine, vol. ii. p. 356.)

Murchison (St. Thomas Hospital Reports, 1871) collected 31 cases, and gives the following conclusions: —

1. The period of incubation of typhus fever varies in duration in different cases.

2. In large proportion of cases it is about twelve days.

3. In exceptional cases it is longer than twelve days; but it rarely, if ever, exceeds three weeks.

4. In many cases, one-third or more, it is less than twelve days; and occasionally there is scarcely any latent period, the symptoms commencing almost at the instant of exposure to the poison. It would seem that the poison of typhus may be so concentrated or the system may be so susceptible to its action that its effect may be almost instantaneous. Generally, the patients are conscious of the moment when the fever poison enters the system.

Moore says he has often suffered from a "typhus headache" almost immediately after exposure to the poison of this disease; and the same thing is said by Doty, of New York.

Moore gives in detail the history of the case of Dr. Harvey, of Dublin, who died Dec. 28, 1881, of typhus fever, in which the period of

incubation could not have exceeded ten days, and was, most probably, eight or nine days in length.

Niemeyer (Text-book of Clinical Medicine) gives two examples of typhus fever which are valuable as contributions to the evidence as to the duration of the period of incubation.

In the year 1854, 2 typhus patients were received into the Magdeburg Hospital from the prison, which was much crowded. For months previous there had been only a few cases of typhoid, and not a single case of typhus in his wards. Eight days after the reception of these patients, two others, who had lain beside them, were attacked by the same disease. One of the latter patients had been admitted for intermittent fever, and the other for epilepsy.

Again, in March, 1855, a tradesman from Heiligenstadt was attacked with typhus fever while away from home. He was received into Niemeyer's ward, in which no typhus had been treated for almost a year. Eight days after the reception of these patients a blacksmith's apprentice and a mechanic lying next to him were attacked by the fever.

Murchison suffered from two attacks of typhus. In the second the incubation stage lasted exactly five days.

Davies (in the *Medical Times and Gazette* of Oct. 19, 1867, p. 428) says 4 Norwegian sailors, on the night of the arrival of their ship in Bristol from Onega, visited some typhus fever nests; and all 4 sickened with typhus eight days later.

Doty (American System of Practical Medicine, 1897, vol. i. p. 340) gives the range as from eight to twelve days, usually the latter. Hutchinson, of Philadelphia, refers to a case where the incubation was thirty-one days. In the city of New York, where a clear history could be obtained in the cases of typhus occurring in 1881–82 and 1892–93, the period of incubation was found to be about twelve days.

Weiss (Diagnostisches Lexikon, 1893) gives the period of incubation as two to three days.

Williams (Twentieth Century Practice of Medicine, vol. xiii. p. 380) says the incubation period of typhus fever is usually twelve days, but shorter periods are by no means rare, and many well-authenticated cases of periods of eight days are on record. The longest known period of incubation appears to be twenty-one days, but instances of periods approaching this length are rare.

The Period of Observation should be twenty-one days; and the patient may be discharged, if in good health, at the end of this time.

The infection of typhus is very virulent, but the area in which it acts is limited.

Murchison believed it was most infectious "from the end of the first week up to convalescence." During the first week of the fever there is relatively little danger; and, if the patient is isolated within that time, others seldom contract the disease. Infection ceases when the appetite and digestion are restored. The average duration of an attack of typhus is about two weeks (13.43 days); and, of 500 cases that recovered, in not one did the duration of the illness exceed nineteen days. Three weeks would therefore appear to be sufficient time for isolation. The infection clings to clothes so much that it has been supposed that typhus fever is most infectious during convalescence, the real fact (Williams) being that the imfection in the cases on which this opinion was founded was derived from clothes which the convalescent then again began to use. Clothes worn at or about the time of the beginning of the disease, and bedding used during the attack, should therefore be disinfected or burned.

Licéaga (Twentieth Century Practice of Medicine, vol. xv. p. 275) gives the average duration of incubation as twelve days, It may be less than three or as many as twenty.

Clothing may retain the poison for long periods. He narates a case where underclothing used by a patient was washed and ironed, but not disinfected, and put away for eight months, and then worn by two sisters, who were taken ill with the disease. The germ of typhus fever may thus retain its activity to at least eight months.

Conclusions.

1. The Incubation Period of Typhus Fever is usually twelve days, but it may be as short as eight or as long as twenty-one days.

2. The Period of Observation after exposure should be twenty-one days.

3. The Period of Isolation should be twenty-one days; and thorough disinfection of the patient and his belongings, and burning of articles where possible, should be practised before release of patient.

MUMPS.

Incubation.

The Period of Incubation of mumps is a somewhat variable one, and different estimates of its length are given. In general, it would seem to vary from one to three weeks, with an average of about two weeks. (Griffith, American System of Practical Medicine, Loomis, 1897, vol. i. p. 726.)

An incubation period of six weeks has been reported (Nicholson) and as short as three or four days (Leitzen). There are, as a rule, no symptoms during this time.

Eustace Smith (Allbutt's System Practical Medicine, 1897, vol. xi. p. 233) gives the report of the Clinical Society (Supplement to vol. xxv., 1892) in which mumps incubation was said to vary from fourteen to twenty-five days. When the complaint begins, it is infectious from the very first, and can be communicated while the patient is merely ailing, and before any signs of glandular swelling are to be detected. Its duration is ten days to a fortnight, but the patient must be considered unsafe to others for at least a week longer.

Kauders (Diagnostisches Lexikon, 1894, p. 621) gives the incubation stage as from nine to twenty-five days. The contagion is usually over at the end of three weeks.

Williams (Twentieth Century Practice of Medicine, vol. xiii. p. 379) says the incubation period in epidemic parotitis is long, the usual period being twenty-one days, but periods of nineteen, eighteen, and seventeen days are frequent. There is some evidence that the period tends to be shorter when the person infected has been exposed to infection continuously, or at least for several days at the commencement of the illness of the infector. The shortest period is probably fourteen days, though some writers have believed that it might be only eight days (Biedert, Demme). The longest period known is twenty-five days.

The period of observation mentioned by the Code of Rules for the Prevention of Infectious and Contagious Diseases in Schools is twenty-four days, but it probably would be safer to extend this to twenty-five days.

Mumps is very infectious at the earliest stage, and during the pro-

dromal symptoms, if they occur. The prodromal stage, before the parotids begin to swell, should be taken to last four days, although it is not often so long. The risk of infection diminishes progressively from the onset of parotitis, and, as a rule, has ceased in three weeks from the beginning, probably in most cases in a fortnight, if all swelling of the parotids and all other glands have subsided.

The Code of Rules for the Prevention of Contagious and Infectious Diseases in Schools* directs isolation for four weeks, when the patient may mix with others if all swelling have subsided.

It should be borne in mind: First, that mumps is infectious in the prodromal stage; and persons who have been in contact with the patient during this stage, which must be assumed to comprise the four days before the onset of the swelling, even though no illness have been complained of, must be regarded as possibly infected, and kept under observation. By isolating persons first seen ten days after exposure to infection, it may thus still be possible to limit the spread of the infection by such persons, even if they subsequently develop the disease themselves. Second, since the incubation period is most likely nineteen to twenty-one days, and is sometimes twenty-four or twenty-five days, it is well worth while to isolate a person who has been exposed to infection a fortnight or even three weeks earlier. Third, isolation of mumps is easy, since the infection does not appear to be readily carried far from the body of the infected individual. Confinement of the patient to his own room is commonly effective in preventing spread through a household, if other children are excluded from all communication.

Conclusions.

1. The usual Period of Incubation of Mumps is three weeks. The shortest period is probably fourteen days. The longest period known is twenty-five days.

2. The Period of Observation should be twenty-five days.

3. The Period of Isolation should be twenty-eight days; and, if all glandular swelling have subsided, and there is no tenderness of the breasts or other parts of the body, the patient may be released.

*Code of Rules for the Prevention of Infectious and Contagious Diseases in Schools, issued by the Medical Officers of Schools Association, London, 1886.

SCARLET FEVER.

Incubation.

This period is very short, probably never extending beyond a week, and rarely lasting so long. It may be only twenty-four hours; but, on an average, it varies from three to five days. In 1861 Trousseau declared that neither in measles nor in scarlet fever could "the duration of the latent period be rigorously determined in the present stage of our knowledge." While, still later, Obermeier gave it as his opinion that the incubation period of scarlatina was unknown.

Murchison * collected 75 cases of scarlet fever, having any bearing on the question, which had either come under his own observation or been communicated to him in the twenty years ending 1878. Of the total 75 cases, in not one did the incubation period exceed six days. In 73 cases it could not have exceeded five days. In 54 cases it could not have exceeded four days. In 20 cases it could not have exceeded three days. In 15 cases it could not have exceeded two days. In 3 cases it could not have exceeded twenty-four hours. It also appears that the longest period of incubation made out in any of the cases was four and one-half days, and that in only 2 of the cases was it certain that it was as long as four days.

Murchison's conclusions are as follows: —

1. The duration of the incubation stage may be only a few hours.

2. Probably in a large proportion of cases it does not exceed forty-eight hours.

3. It very rarely exceeds seven days.

4. Consequently, a person who has been exposed to scarlet fever, and does not sicken after a week's quarantine, may be pronounced safe.

Moore gives the following: —

"A gentleman, æt. 20, went from Dublin into the country November 2, three weeks after the disappearance of the rash of scarlet fever. On his arrival, the same day, he saw two sisters, both of whom took to bed with scarlet fever November 8; *i.e.*, in six days,—incubation = five days."

"A boy, æt. 8, sickened with scarlet fever on January 12. His

* Observations on the Period of Incubation of Scarlet Fever and of Some Other Diseases (Clinical Society's Transactions, vol. xi. p. 238, 1878).

sister took ill on the 17th, and five days later another sister sickened."

"Two girls, cousins, slept in the same bed on April 5 and 6. One of them complained of sore throat in the night of April 5, and showed the rash of scarlatina on the morning of the 7th. The other sickened on April 10; *i.e.*, on the fourth day."

"Of two sisters, one took ill on Dec. 27, 1871, and was at once isolated. The other remained under the same roof, but without seeing her sister until they met by accident on Feb. 4, 1872. She sickened with scarlet fever seven days later, on February 11.

Caiger (Allbutt's System of Medicine, 1897, vol. ii. p. 132) says, in the large proportion of cases, between a single definite exposure and the first appearance of the fibral symptoms, it has been either two, three, or four days. In some well-authenticated cases it has been less than forty-eight hours, but not much less. On the other hand, it is sometimes as long as five days, and, in rare instances, even six. If the first case in a family was properly isolated and the necessary measures for disinfection scrupulously carried out, the safety of the other members is practically assured, if no second case has arisen before the end of a week.

Robinson (American System of Practical Medicine, 1897, vol. i. p. 584) accepts the report of Williams for the Clinical Society of London (*Practitioner*, July, 1894), who tabulates the opinions as follows: —

	Usual time, days.	*Minimum time, days*	*Maximum time, days.*
Committee of the Clinical Society, 1892	2 or 3	1	7
Bristowe, 1887	6 to 8	often less	occasionally longer.
Guinon, 1892	4 or 5		
Strümpel, 1887	less than 4		7

Hamilton (*British Medical Journal*, June 3, 1894), from an experience of a severe epidemic among troops, claims that the period of incubation of scarlet fever is three or four days. In some inoculation experiments the time of incubation has been seven days. Bokai (*Pester medicinisch-chirurgische Presse*, v. p. 990) reports 2 cases of tracheotomy in which scarlet fever developed sixteen hours after exposure. Soerensen (*Internationaler klinische Rundschau*, Nos. 6 and 7, 1889) states that in 10 cases operated upon by Paget, in which

scarlet fever developed, the period of incubation was one day in 2 cases, two days in 3, and three days in 3 cases. He also says that in 9 out of 12 cases of puerperal scarlet fever the period was three days. It would seem probable from these figures that, where infection occurs through a wound, the time of incubation is shortened.

Unger (Diagnostisches Lexikon, 1895) says the period of incubation may be less than twenty-four hours where it enters the body through a wound. In other cases it is two to four days or four to seven days, but seldom more.

Crandall (Cyclopædia of Children's Diseases, 1899, vol. v., Supplement, p. 237) says the extremes in authenticated cases varies from a few hours to fifteen days. In 84 per cent. of cases Holt found the period to be less than six days, and in 66 per cent. between two and four days.

Williams (Twentieth Century Practice of Medicine, vol. xiii. p. 376) says scarlet fever usually comes on during the second or third day after exposure.

Reimer believed that in more than two-thirds of the 3,624 cases which he collected the disease came on within the first three days after exposure.

The Clinical Society's Committee collected 28 cases of disease following exposure for the usual time to a known source of infection. In 16 the earliest symptoms were observed before the end of the third day; in 10, before the end of the second day. In 2 the interval was seven days, and on 1 eight days. Including other cases observed with precision, there were 106 cases in which 52, or nearly one-half, began before the end of the third day after exposure; while 47 began on the second or third day. Eight days must be taken to be the extreme limit of the period of incubation.

The period of observation given in the Code of Rules for the Prevention of Infectious and Contagious Diseases in Schools is fourteen days; but ten days would probably be sufficient if care were taken to make certain that the person was free from all fever and sore throat, and if the fomites which have been in contact with the infection be disinfected.

Scarlet fever is infectious from the appearance of the earliest symptoms, and until desquamation has ceased, and all signs of

inflammation of the mucous membrane shall have passed away. Infection may be conveyed by the suppurating discharge of middle ear disease until a late period. The urine in consecutive albuminuria is also said to be infectious. The period of isolation should not be less than six weeks; and the patient should receive a series of baths, and should not be liberated unless "desquamation have completely ceased, and there be no appearance of sore throat" (Code). Under exceptional circumstances, however, the individual may be actively infectious as long as eight weeks after the commencement of an attack; and it is not safe to lay down any absolute rules on which laymen can be allowed to act on their own responsibility.

Conclusions.

1. Scarlet Fever has an Incubation Period of two to three days, as a rule; but it may be eight.

2. The Period of Observation should be ten days, provided there is absence of fever and sore throat and all fomites are disinfected.

3. The Period of Isolation should be seven weeks from the appearance of the eruption and desquamation should have ceased, the nose and throat should be healthy, all complications should be over, and thorough disinfection of house, patient, and belongings should have been done before the patient is released.

WHOOPING-COUGH.

Incubation.

During this period no symptoms of the disease present themselves. Statistics are at variance regarding its length, and the fact that the incubation takes place so insidiously makes the determination of the exact duration of the incubation difficult in most cases. It probably lasts from two to seven days, with an average of three to four days. (Griffith, American System of Medicine, 1897, vol. i. p. 715.)

Eustace Smith (Allbutt's System of Medicine, vol. ii. p. 239) says it probably varies in different individuals. In one very clear case, noted by Dr. Bristowe, the period was exactly a fortnight; but according to some writers it may be as short as four days. The infectiousness begins with the earliest symptoms. Indeed, it is in the

early, non-spasmodic stage that the child is most likely to be a source of danger to others; for, when the whoop appears, his power of communicating the disease begins to decline. Still, it is not at an end until a period of at least six weeks has elapsed from the beginning of the attack.

Williams (Twentieth Century Practice of Medicine, vol. xiii. p. 378) says the period of incubation is somewhat uncertain. The usual period between exposure and beginning of catarrhal symptoms is seven to ten days. The characteristic whoop appears seven days later, as a rule, so that the interval between exposure and whooping is usually about fourteen days.

The Code of Rules for the Prevention of Infectious and Contagious Diseases in Schools recommends the period of observation to be twenty-one days; but probably fifteen days would be sufficient if the individual were examined carefully at the expiration of that period, and found to be free from all trace of catarrh of the fauces and pharynx and of all signs of bronchitis.

The infectiousness is marked in the earliest stage, and before the characteristic whoop begins. It declines rapidly after the acute stage has passed. On the authority of Williams, Weill, who in 1894 expressed the opinion that whooping-cough was contagious only during the premonitory catarrhal stage, has since (*Lyon Médical*, May 9, 1897) put his opinion to the test. On various occasions he permitted nearly one hundred young children, who had not previously suffered from whooping-cough, to be associated in the same ward for twenty days or more with children suffering from the disease during the stage of whooping. In only one case was the disease contracted, and in this instance the patient from whom the infection was derived was in the very earliest period of the whooping stage. In three small epidemics he was able to satisfy himself that infection was contracted from children who had not yet begun to whoop. Weill concludes that infection ceases very soon after the characteristic whoop commences, and that therefore in a family it is not the patient who is already whooping, but his brothers and sisters who have not begun to whoop, that ought to be isolated.

The Code of Rules for Prevention of Infectious and Contagious Diseases in Schools says that the patient should be kept isolated from

susceptible persons for six weeks from the commencement of the whooping, and should then be allowed to mingle with others only if the whoop and all characteristic spasmodic cough have ceased. If all cough have completely passed away earlier, which is not often the case, this rule may be relaxed and the period of isolation shortened.

Conclusions.

1. The duration of the Incubation Stage of Whooping-cough is four to ten days.

2. The Period of Observation should be twenty-one days,

3. The Period of Isolation should be six weeks from the commencement of the whooping, or when the spasmodic cough, or whooping, has ceased, and whenever cough has entirely left.

MEASLES.

Incubation.

Ten days, as a rule, elapse between the reception of the poison into the system and the manifestation of the earliest febrile and catarrhal symptoms, or fourteen days between the infection and the appearance of the rash. These are Panum's estimates, based on his observations in a newly infected community of the Faroe Islands in 1848.

Hebra successfully inoculated with the nasal mucus, and found the symptoms showed themselves in eight days, the difference in time representing the effect of the resistance offered to the invading virus by the skin and mucous membrane. The stage of incubation is shortened after inoculation.

Moore gives the following experiences of March 26, 1876:—

A married lady, æt. 21, fell ill of measles. Her parlor maid had sickened with the same disease ten days previously; *i.e.*, on March 17. At 3 P.M. on the 26th inst. Mrs. A. B. felt thirsty, chilly, and fatigued, and her appetite failed. The rash appeared on the face of the patient on the 30th (fifth day). The fastigium, 103.4 F., was reached at 1 P.M. of April 1 (seventh day), when the eyes were suffused. Defervescence was complete on April 3. In this case the duration of the latent period was almost certainly ten days.

In the spring of 1877 both measles and scarlatina were prevalent in Dublin, and it was difficult effectually to isolate the incoming cases in the epidemic wards of the general hospitals. In 2 instances, at the Meath Hospital, scarlatina patients unfortunately contracted measles while convalescing. In both cases the symptoms of measles were detected on the eleventh day after exposure; *i.e.*, on the eleventh day after admission to the hospital.

Owing to the fact that measles is infectious from the outset, and that the first case in a household may be readily mistaken for a common cold, the attempt to arrest its spread by adopting preventive measures, especially isolation, is practically futile. Hence the difficulty of arresting an outbreak of this disease in a family or community. Should an individual have been exposed to the infection of measles, at least sixteen days' quarantine will be necessary before he can be pronounced safe.

A patient who has passed through an attack of measles should not be declared free from infection until at least three and, preferably, four weeks have elapsed from the first symptoms. It will be remembered that the stage of desquamation generally lasts until the eighteenth day. (Moore.)

Williams (Allbutt's System of Medicine, 1897, vol. ii. p. 102) says the interval between exposure and the prodromal symptoms is usually ten days, but may be as short as five and perhaps four days. On the other hand, it may be as long as fourteen days, in which case the rash would not appear until the seventeenth or eighteenth or even nineteenth day after infection. Though the period of about fourteen days from exposure to the appearance of the rash is that met with in the vast majority of cases, it is important to recognize that it may be four or five days longer, since such exceptional cases must be taken into account in estimating the period for which a susceptible person who has been exposed to infection should be isolated from other persons who have not had the disease. An interval of a full fortnight must be allowed; and at the end of that time the person must be free from fever, catarrh, and photophobia before it can be said that he has escaped infection.

Griffiths (American System of Practical Medicine, vol. i. p. 627) says the majority of observations agree in fixing the incubation period at ten to twelve days.

Hochsinger (Diagnostisches Lexikon, 1894, p. 155) gives ten days as the period of incubation.

Crandall (Cyclopædia of the Diseases of Children, vol. v., Supplement, 1899, p. 245) says it may range from nine to twenty-one days. Among 144 cases Holt found it to be between eleven and fourteen days in 66 per cent. Crandall has seen repeatedly the initial symptoms appear twelve days after exposure. He thinks twelve days is the most common period of incubation. Except in complicated cases, in which the catarrhal symptoms are prolonged, the period of infection is not over twenty-eight days.

Williams (Twentieth Century Practice of Medicine, vol. xiii. p. 374, 1898) says the duration of the interval between exposure to the infection and the appearance of the rash is usually fourteen days. Almost as often it is a day more or a day less. The pre-eruptive, or prodromal, stage is of uncertain duration. It may be one day or may extend to five days. The incubation period of measles is, therefore, two or three days, as a rule, less than the interval mentioned above; and probably in most cases it is eleven or twelve days. It is believed to have a tendency to be short in cases where the subsequent attack is severe, with high and protracted pyrexia; and, on the other hand, a long period of incubation is said to be followed usually by a mild attack. When produced by inoculation, the period of incubation is said to be seven or eight days.

The period of observation recommended by the Report of the London Clinical Society is fourteen days, and at the end of that time the patient must be free from fever or catarrh.

The Code of Rules for the Prevention of Infectious and Contagious Diseases in Schools fixes sixteen days as the period of observation.

The infectiousness of measles exists from the earliest period of the developed disease. There is no notable diminution of the power of infectiousness during the whole acute stage, and there is no doubt that a patient may often be capable of conveying measles to another after convalescence has advanced far enough to allow him to go back to his usual avocations. It is well established that infection is more often spread during the prodromal period.

The period of isolation should extend to three weeks at least, and

the patient should be free from all desquamation and cough before being allowed to mix with susceptible children. The infective principle has a low power of maintaining itself outside of the body, and does not survive long in fomites under ordinary circumstances.

Conclusions.

1. The Incubation Period of Measles is eleven or twelve days. It may be ten or, possibly, shorter. On the other hand, it may be as long as fourteen days.

2. The Period of Observation should be sixteen days.

3. The Period of Isolation should be at least three weeks and sometimes four, and the patient should be free from desquamation and cough before being released.

CHICKEN-POX.

Incubation.

Moore states: "Incubation. The stage of latency is believed to be, on an average, about as long as that of Small-pox; namely, twelve days. Makuna states that it varies from eight to seventeen days. Bristowe says that in some cases it lasts exactly a week, but perhaps more commonly a fortnight. According to Thomas, it varies from thirteen to seventeen days; while Trousseau extends the duration to from fifteen to twenty-seven days. On the other hand, Gregory limited it to from four to seven days. The discrepancy, in Dr. Hilton Fagge's opinion, arises from the fact that the length of the incubation has in general been calculated upon the very precarious basis of the interval between the dates at which different children of the same family have been successively attacked. Towards the close of this stage there is, according to Thomas, in some cases, a slight rise in temperature."

MacCombie (Allbutt's System of Medicine, 1897, vol. ii. p. 179) says that it varies from eleven to nineteen days, fourteen being most common. He has not seen it in less than thirteen or longer than seventeen. If inoculated, the incubation period is stated to be ten days.

Welch (American System of Practical Medicine, 1897, vol. i. p.

570) says, when the disease breaks out in a private family or an institution for children, the time that elapses between the appearance of the eruption in the first and second cases is usually from thirteen to seventeen days. This may therefore be regarded as about the usual period of incubation, although a much shorter period has been reported by some observers.

Unger (Diagnostisches Lexikon, 1895, p. 471) gives the stage of incubation from thirteen to nineteen days.

Williams (Twentieth Century Practice of Medicine, vol. xiii. p. 374, 1898) gives the interval between exposure to infection and the appearance of the eruption of varicella as usually fourteen days; and, since prodromal symptoms are very inconstant, this must be reckoned as the usual incubation period. It may be one day less, possibly, in exceptional cases, three days less. A period of nineteen days has frequently been established. The incubation period in inoculation is said to be ten days.

The period of observation, given by the Code of Rules for the Prevention of Infectious and Contagious Diseases in Schools is eighteen days.

Williams considers it safer to prolong it to twenty days.

During the period of incubation the patient, as a rule, presents no symptoms; but for a day or two before the eruption comes out there may be some *malaise*, and it is probable that infection may be contracted from the patient at this time. The patient continues to be infectious until convalescence is over and all scabs have become detached, especially of the scalp. Infection can probably be carried by fomites.

Conclusions.

1. The Period of Incubation of Chicken-pox is usually fourteen days. It may be from eleven to nineteen days.

2. The Period of Observation should be twenty days.

3. Infectiousness lasts until convalescence is over and all scabs, especially of the scalp, have been detached. This, then, should be the Period of Isolation.

GERMAN MEASLES (ROETHELN).

Incubation.

J. Lewis Smith, in the epidemic of 1874 in New York, did not find the stage of incubation to be uniform. In some instances it appeared to be from seven to ten days, and in other instances from eighteen to twenty-two days.

Thomas gives to this stage a duration of from two and a half to three weeks.

Moore observed in 1878 two cases, a brother and sister, the latter of whom sickened twelve days after her brother.

Williams (Allbutt's System of Medicine, vol. ii. p. 118, 1897) admits that the incubation period is not well determined, and says it is probably most often seventeen or eighteen days; but it may be two or three days more, or five or even, perhaps, seven days less. A person who has contracted the disease is capable of conveying the infection to others two or three days before the rash appears; that is to say, while he is himself quite free from any obvious symptoms of illness. The capability of infecting others remains during the presence of the rash, but declines rapidly, and in mild cases disappears in a week, though it may persist a little longer after more severe attacks or, perhaps, when there is much desquamation.

Griffiths (American System of Practical Medicine, vol. i. p. 640) gives as an average estimate, based upon the experience of many observers, a period of from one to three weeks.

Unger (Diagnostisches Lexikon, 1895) gives the incubation period as eighteen to twenty days.

Edwards (Cyclopædia of the Diseases of Children, vol. v., Supplement, 1899, p. 254) says the period is between seven and fourteen days.

Williams (Twentieth Century Practice of Medicine, vol. xiii. p. 375, 1898) says the incubation period is, as a rule, rather longer than measles. Prodromal symptoms are not always present or are so slight as to escape observation, and it is therefore necessary to reckon the incubation period to the date of the appearance of the rash. This is given by the Clinical Society's Report as eighteen days, but it may be more than two and less than three weeks with-

out being at all exceptional. It is occcasionally as short as five days. It seldom or never exceeds twenty-one days, although Baginsky (Lehrbuch der Kinderkrankheiten) admits twenty-four days.

The duration of the period of observation, according to the Code of Rules for the Prevention of Infectious and Contagious Diseases in Schools, should be sixteen days. The Clinical Society's Report is probably safer, which gives "two days more than three weeks."

German measles may be infectious for two or three days before the rash appears. It is in all cases infectious while the rash is out; but the infection declines rapidly, and in mild cases has probably ceased at the end of a week. In more severe cases it lasts longer, and risk cannot be considered as past so long as any desquamation continues.

The Code prescribes an isolation of two or three weeks, the exact time depending upon the nature of the attack.

Conclusions.

1. The Incubation Period of German Measles is eighteen days usually, but it may be possibly five to twenty-one days.

2. The Period of Observation should be twenty-three days.

3. The Isolation Period should be fourteen to twenty-one days, according to the severity of the attack.

SMALL-POX.

Moore says: "Incubation begins with the reception of the virus into the system, and ends at the appearance of the earliest symptom. Its average duration is twelve days, except in cases of inoculation, when it is only eight days, or still shorter, forty-eight hours, according to Curschmann. As a rule, there are no symptoms in this stage; but towards its close the patient probably feels unwell and out of sorts,— what the French aptly call *malaise*."

MacCombie (Allbutt's System of Medicine, 1897, vol. ii. p. 187) says it varies between extremes of five days and twenty or more. Usually it is twelve days, but not infrequently ten, eleven, thirteen, or sometimes nine. In a few exceptional cases symptoms of *malaise* occur from the date of reception of infection. Armstrong (*Lancet*,

1886, vol. i. p. 715) has given particulars of a case in which it appeared to be twenty-one days.

Welch (American System of Practical Medicine, 1897, vol. i. p. 522) gives it as from ten to twelve days. It is seldom less than eight or more than fourteen days.

Hebra (Diagnostisches Lexikon, 1898) gives the stage of incubation as between ten and fourteen days, seldom under that time.

Williams (Twentieth Century Practice of Medicine, 1898, vol. xiii. p. 373) says the initial symptoms come on, in a large majority of cases, on the eleventh or twelfth day, and the eruption appears on the fourteenth day. An interval of ten days only between the exposure and the initial symptoms is not very uncommon; and then the eruption appears on the thirteenth day. An interval of only eight days is rare; but Eichhorst has recorded three cases, one in a physician and two in medical students, in which the initial symptoms commenced in two of the individuals in nine days and eight hours after exposure, and, in the third, nine days and four hours. So short an interval is rare; but, when the disease is conveyed by inoculation, the initial symptoms appear on the eighth or ninth or, occasionally, on the seventh day. It is said the short periods are observed more often in hot countries than in temperate climates. There is some evidence that the incubation period of hæmorrhagic small-pox is rather shorter than that of the discrete form of the disease. Longer intervals are rather more common. Thus periods of thirteen, fourteen, and fifteen days between exposure and the initial symptoms are not very rare; and cases have occurred which appear to prove that it may be prolonged to twenty days.

The Report of the Clinical Society of London gives fifteen days as the *period of observation*, provided the individual at that time shows no signs of indisposition and presents no elevation of temperature. The Code of Rules for the Prevention of Infectious and Contagious Diseases in Schools gives eighteen days. Williams says it will be safer to put the period of observation at three weeks.

The infection can be preserved for a long period in clothes and other fomites, and in the hair of a person who has been in intimate contact with a small-pox patient. Cases are recorded in which the infection has thus been carried by nurses.

The disease is infectious from the onset of symptoms until all scabs have become detached and until all desquamation has ceased. Great care should be exercised in any case in which a suppurating discharge is left as a sequel to the disease.

Conclusions.

1. The Stage of Incubation of Small-pox is eleven or twelve days usually. It may be eight days and perhaps twenty days.

2. The Period of Observation should be three weeks.

3. The patient may be released from Isolation when all scabs, especially of the hands and feet, have become detached, all desquamation has ceased, and no suppurating discharge left as a sequel, provided there has been thorough disinfection of everything.

DIPHTHERIA.

Incubation.

Osler (Practice of Medicine) gives the period of *incubation* as from two to seven days, generally two days.

Wood and Fitz say it is two days or more.

Hilton Fagge and Pye-Smith (Practice of Medicine) give as follows: —

Trousseau puts the period at from two to seven days.

Oertel puts the period at from two to five days, but he quotes cases in which it was longer.

Jenner relates a case of eight days.

Senator says that the interval may be as much as three or four weeks. Where there has been a direct transference of the poison from one person's fauces to another's, the period seems to be much shorter.

Valleix had a pellicular deposit on the tonsil the day after he became infected with the disease, and died in forty-eight hours.

Oertel supposes that the incubation period is likely to be less prolonged during the prevalence of an epidemic, especially where the type is malignant.

Williams (Twentieth Century Practice of Medicine, vol. xiii. p. 377) gives the usual period of incubation of diphtheria of the throat or

larynx as two days, and not often exceeding four days, although it never really exceeds this period, and is seldom less than two days.

The Code of Rules for the Prevention of Infectious and Contagious Diseases in Schools gives twelve days as the *period* of *observation*, which is ample, if the infection is spread by personal intercourse, and not by other means.

The infection of diphtheria may hang about a house in carpets, beds, etc., for months or perhaps years. A person may be infected by a patient in the incubation stage during the whole of the attack, and for a period of long but uncertain duration after apparent recovery. These conclusions, based on the study of the history of cases observed clinically, are fully confirmed by bacteriology, which has shown that the specific bacillus may persist in the throat for many weeks and even for months. As a rule, where infection has been thus transmitted at a late period, after the symptoms of the disease have passed away, some unhealthy condition of the tonsils or pharynx has persisted; and, all cases, in which such morbid states continue after diphtheria should be regarded as possible sources of infection to susceptible children brought into intimate relations with the patient. The infection may be contracted by intimate contact with the body of a person who had died of the disease.

The period of *isolation* after an attack of diphtheria which has satisfied the Medical Officers of Schools' Association is not less than three weeks after convalescence is completed, provided there is no longer any form of sore throat nor any kind of discharge from the throat, nose, eyes, ears or other parts, and no albuminuria. The termination should depend on the disappearance of all local lesions and the bacillus from the throat.

Conclusions.

1. The Period of Incubation of Diphtheria of the throat or larynx is usually two days. It does not often exceed four days, but occasionally reaches seven.

2. For a single exposure the Period of Observation should be twelve days.

3. The Period of Isolation after an attack of Diptheria should be not less than three weeks after convalescence, provided there is no evidence

of inflammation or discharge from the throat, nose, eyes, ears, or other parts of the body, and no albuminuria. Probably a better rule would be the obtaining of two consecutive negative cultures from the nose and from the throat before release of the patient.

YELLOW FEVER.

Incubation.

The period is comparatively short, probably never exceeds five days. Instances of attacks occurring inside of twenty-four hours after exposure are well authenticated. Several authors have insisted that the period of incubation may be prolonged two weeks or more; but this is probably an error, based upon the misinterpretation of the facts observed. (Sternberg, American System of Practical Medicine, 1897, vol. i. p. 281.)

Davidson (Allbutt's System of Medicine, 1897, vol. ii. p. 394) says the period of latency in yellow fever may be put down as ranging between twenty-four hours and four or five days. The length of time elapsing between the date of exposure and the declaration of the disease, which does not necessarily correspond with the period of incubation, has been known to extend to forty-five days or longer.

Weiss (Diagnostisches Lexikon, 1893) gives the period of incubation as two to three days, as a rule, with occasionally a longer or a shorter period.

Williams (Twentieth Century Practice of Medicine, 1898, vol. xiii. p. 383) gives the usual incubation period of yellow fever as four days, or a day more or less. Bemis (Pepper's System of Medicine, 1885, vol. i. p. 843) says the period may be as short as twenty-four hours, but states that in the three cases in which he was able to fix the hours of first exposure with precision the attacks followed in seventy-two, eighty-three, and one hundred and one hours respectively.

Williams thinks the period of *observation* of one exposed a single time ought to be a fortnight at least.

Williams says the infection is probably seldom derived from the patient direct, but it is easily contracted from fomites in which it may be preserved for long periods or from the structure or fittings of foul ships. He accepts the bacillus described by Sanarelli (*Annales*

de l'Institut Pasteur, June 25, 1895) as the infective agent, which is very resistant to drying, but is easily killed by direct sunlight. He says that under certain conditions, which would appear to be particularly liable to be produced on shipboard, it may be called into activity when otherwise unable to flourish by the growth, in its vicinity, of certain moulds,— a fact which may account for the manner in which the infection has clung to ships, springing into activity at irregular intervals.

The conclusions which we seem justified in drawing from the above are: —

1. The usual Period of Incubation of Yellow Fever is four days. It may be inside of twenty-four hours in exceptional cases or be extended to five days.

2. The Period of Observation of one exposed to the infection ought to be a fortnight at least.

3. The Period of Isolation should extend to the end of convalescence, and all articles in contact or near the patient should be disinfected and many of them burned.

INFLUENZA.

Incubation.

The period of incubation is brief, varying from a few hours to two or three days. This period is usually unattended by subjective symptoms. (J. C. Wilson, American System of Practical Medicine, 1897, vol. i. p. 407.)

Drozda (Diagnostisches Lexikon, 1893) gives the period of incubation from a few hours to one or two days.

Jennings (Cyclopædia of the Diseases of Children, 1899, vol. v. p. 312) says the period is from one to four or five days, and many cases develop within a few hours.

Williams (Twentieth Century Practice of Medicine, 1898, vol. xiii. p. 382) says the usual period is probably two or three days. The Clinical Society's Report concludes that it varies from one day or a few hours less to four or five days, but that the usual period is three or four days.

Parsons (Report on the Influenza Epidemic of 1889–90, Local

Government Board of England, 1891, pp. 63 *et seq.*) estimates it at two or three days. Periods as long as seven days have been reported; but during an epidemic of influenza it is exceedingly difficult to exclude the possibility of unrecognized exposure, owing to the number of ambulatory cases, and of mild attacks which the sufferers call common colds, and for which they do not undergo any period of isolation.

The period of *observation* after an exposure Williams concludes should be six or seven days.

"The patient is infectious throughout the acute attack, and may continue infectious until convalescence has advanced far enough to permit him to return to his ordinary avocations; and it is probably in this way that influenza is most generally spread. The period of isolation ought to be a week to ten days after the commencement of the disease, according to the severity of the attack. In cases complicated by pneumonia it should be extended to the end of convalescence." (Finkler, Twentieth Century Practice of Medicine, vol. xv. p. 51.)

Incubation Period.— In the German Collective Investigation Report, some cases are recorded in which the disease originated in a family in consequence of a definite importation; and in a number of instances physicians were able to determine in their own persons how many days after they had visited their first and only case of influenza they were themselves attacked. Based on these observations, the period of incubation was decided to be from two to six days in length. Very rarely it was as short as one or two days. The longest period that has been positively determined is seventeen days.

Conclusions.

1. The Period of Incubation of Influenza is two or three days usually.

2. The Period of Observation after exposure should be six or seven days, according to the virulence of the epidemic.

3. The Period of Isolation of the sick should be a week to ten days after the commencement of the disease, according to the severity of the attack.

THE PRESIDENT.—Fortunately, it is not necessary to insist upon the importance of such a paper as Dr. Cutler's to a collection of gentlemen charged with the important functions that the various boards of health of the Commonwealth are charged with: and I am sure they also appreciate the excellence of what Dr. Cutler has done for us, and I need not add how great will be the interest with which we shall look to the publication of it in full. Among all the powers that a board of health exercises, there certainly is no one that trenches so deeply upon the liberty of the individual as this right to quarantine; and there is no one that ought to be so safely guarded, there is certainly no one that ought to be so prudently and wisely exercised. I think that it is a matter that this Association cannot too much discuss or too much consider. The question is now open for discussion; and, if it helps any man to a conclusion, I think it is also open to judicious questionings.

DR. PRESCOTT.— Mr. Chairman and gentlemen, this is a subject, of course, in which we are all interested; and I am especially interested because I have charge of a school in which there are about one hundred inmates, and where we have a great deal of contagious disease of one sort and another, and it is important that we should know how long to keep a patient isolated after a contagious disease or how long to keep a patient under observation who has been exposed. During the last year we have had epidemics of diphtheria, scarlet fever, measles, and whooping-cough in the home. The diphtheria epidemic we were able to finally stamp out by taking cultures each day of every child in the home, and not letting any child who had the Klebs-Loeffler bacillus in his throat go among the other children. Dr. McCollom, at the South Department, was kind enough to take all the children who had Klebs-Loeffler bacillus in their throats, even without clinical symptoms, as long as he could, which helped us a good deal. It took about eight weeks to stamp that epidemic out. Of course it is the proper thing now not to let the child who has had a positive culture go among other children until after two or three negative cultures have been obtained. It was astonishing in how many cases there were positive cultures from throats that appeared perfectly normal. When the scarlet fever

started, we feared we were going to have as hard a time with that as we had with diphtheria; but we didn't, for it was not more than three weeks before there were no further cases of scarlet fever. It seems much more easy to stop an epidemic of scarlet fever than one of diphtheria. We had also an epidemic of measles, in which there were over forty cases; and with those we had a certain number of cases of cancrum oris. I don't know whether this disease has anything to do with the bacillus of measles; but it has so happened that in the last two epidemics of measles I have seen there have been several cases of cancrum oris and two or three deaths. We have been obliged to keep the patient under observation at least three weeks after the disappearance of the symptoms (in cases of measles) for fear of contagion for the other children. In whooping-cough the length of time we have kept the children apart was rather longer than Dr. Cutler has suggested, and it has been very difficult for me to make up my mind how long a child is dangerous to other children after an attack of whooping-cough. Owing to the danger of giving it to other children, I have been in the habit of insisting that the child with whooping-cough shall be isolated at least twelve weeks; and under these restrictions we have been able to stamp out an epidemic with less than a dozen cases among one hundred children. We were able to stop an epidemic of mumps with only six or eight cases by keeping them isolated three weeks. As regards the length of time necessary for isolation in cases of scarlet fever, I have never made up my mind definitely. Surely, until the end of the first desquamation, probably until the end of the second desquamation; but I do not believe that it is necessary, if there be a third desquamation, as sometimes occurs, to keep them isolated until that is ended.

Dr. W. H. Chapin (Springfield). — Mr. President and gentlemen, I wish to report a series of thirteen cases of typhoid fever which occurred in Springfield, Mass., in the present month. In June we had had very little typhoid. I only found 3 cases, and there appeared no common origin to those 3 cases. On the 15th of July a physician informed me that he had 2 cases of typhoid fever, who had gone to bed the day before. They were near neighbors. In the afternoon of the same day another physician reported a third case, at a distance from the first two. I found that evening that

these three people had a common milk supply; and on that information I sought the milk pedler and was able on the following morning to gather the facts which I will present to you to-day. The milk supplied to the three persons mentioned, and to the other ten which were afterward reported to me, was distributed from a milk station in Springfield in bottles, quart bottles. The milkman assured me — and I believe that he told the truth — that no milk was ever bottled excepting from three dairies in the town of Agawam; and to those three dairies — and, for certainty's sake, to a fourth dairy, which, however, he said had not been used in the bottling — I proceeded. In two out of the three there appeared to be no disease or uncleanliness about the place, and the same is true of the distributing station in the city; but upon the third farm I found that in the spring of 1899 a woman had been sick in bed three weeks, suffering from a disease which was diagnosticated to be grip, and she had some cough, and they said she had bronchitis. I don't know whether the diagnosis was right or wrong; but, at any rate, no other case of illness was found to have existed upon this farm. On the 29th of June, in the afternoon, the man who milked the cows upon that farm cleaned out the privy. His method was to half fill a wagon with sand, deposit the night soil upon that sand, cover it with more sand, carry the whole to a waste place half a mile from the house, and bury it in the sand again. The wagon used for this purpose was an old, ordinarily unused wagon. After it had been used for this purpose, it was stored in a tobacco shed, at some distance from the other buildings, and had not been used for any other purpose since it was used to transport the night soil. I say in the afternoon of June 29, this man cleaned out this privy. He returned from that job, and did the milking. His product of milk for that night was forty quarts. He put all of those forty quarts of milk into a large mixing can, and filled his eight or ten quart can from that mixture.

This milk, transported to Springfield, and arriving at the milk station, was again mixed with an equal quantity of milk from the other two dairies, Nos. 1 and 2. So that there was bottled 120 bottles of milk, all of which was in part the milk of this suspected farm, and the rest from the unsuspected farms, so that, if on that day any milk was infected, 120 bottles were infected. Those bottles were

distributed to the man's customers and to the people who contracted the typhoid fever on the morning of the 30th of June, 1899; and I believe that on that morning these people, who were afterward sick, were infected with typhoid fever. Now for the succession of cases. As I say, in June we had had but 3 or 4 in town; and, besides the 13 cases which I am about to report, in July we have had but 2 others reported, one from the northern part of the town, at a great distance from these 13 cases, and the other in this same district. The one which does not appear to go in this class went to bed on the 15th of July, and took milk from another milk pedler. Remember, the milk was distributed upon the thirtieth day of June. On the seventh day of July a girl, not very strong, went to bed sick; on the 11th, four days later, another girl. Notice the sex and age of the sufferers. On the 13th of July, 2 women in one family and a boy in another family. On the 14th a woman went to bed, and afterward went to the hospital. She, living in this district on the 30th of June, left the town on the first day of July, went to Old Orchard beach, and returned on the fourteenth day of July sick, and went to bed. On the same day, the 14th, the first man in the epidemic went to bed; but he went to bed violently ill from the first. On the 16th, two days later, another man. He had been dragging around for a considerable time. On the 18th the husband of the Old Orchard woman went to bed, four days later than his wife. On the 19th, a young adult; on the 20th, another man; on the 21st, another man; and, lastly, on the 24th, the only exception to the series of cases, a woman went to bed. So far as I know, excepting 1 case that escaped us, left town, and was vaguely reported to be ill, this covers the epidemic.

Now in regard to the incubation of typhoid fever. The date of going to bed seems to me to be the only fixed point that we can take; and, if you will allow the bull, that is not a fixed point, either. But we don't know when symptoms begin in typhoid cases. The centre of the epidemic appears to be the thirteenth day of July, and that is fourteen days after the distribution of the milk.

If we allow that men in active life bear their troubles longer than women and children, struggle to keep about, and go to bed, finally, only when obliged to, we may assume that the men, all of whom fell

after the 13th of July, began to be sick as soon as the women, who fell just before the 13th of July; and, if we assume that they went three days longer than a woman would go, we can see that the list then would read: 2 cases on the 11th, 4 on the 13th, 2 on the 14th, 1 on the 15th, 16th, and 17th. The first case eight days after the distribution of the milk, the last case twenty-five days after the distribution of the milk. The morals that I would draw from this story are: first, that much can be learned by paying attention to a few cases; and, secondly, that the mixing of large quantities of milk in dairies or houses of distribution is a bad thing. It multiplies the possibility of infection remarkably. If I am right in assuming that this man infected his milk from his hands, it is probable that he may have infected but one pailful of milk, that only once did typhoid bacilli fall into his pail; but he proceeded immediately to infect every drop of milk of that milking, and, that not being enough, the milk pedler multiplied it by three. And instead of having 6 quarts of infected milk we had 120 quarts.

DR. DURGIN.— Gentlemen, it was intended by this paper to bring together data for reference, and upon which the different boards of health of our State might agree to act. One of the weak elements in our boards of health is differing with each other. One board of health will treat an infectious disease as dangerous for four weeks, another board of health will treat it as infectious for five weeks, another one for six weeks; and the people not only suffer, but question our right, our intelligence, and our discretion. If we will first study this question carefully, and then unite upon the length of time for the observation and isolation of these cases, we will strengthen ourselves immensely and please the public a great deal more. There is one thing to be said in regard to the great length of time occasionally noted for incubation and the time in which we should hold a patient as possibly infectious. Take quarantine, for instance. If you hold your vessel, the crew or passengers who are supposed to have been exposed, for the extreme limit of time, I believe you make a mistake. I will say, with perfect frankness, I do not believe that you can administer a quarantine or health office solely in the interest of public health. When we administer a quarantine or health office on extreme grounds, with both eyes closed to travel and commerce, we make a mistake.

I am aware that I am saying things which will be questioned, but I venture the suggestion that we may use judgment and reason even in treating public health questions. I think we should agree upon the length of time which would be reasonable to hold persons for observation who may have been exposed, and also upon the conditions under which we will release cases of infectious disease.

THE PRESIDENT.— Dr. Shea.

DR. SHEA.— Mr. Chairman, our department for the past few days has been dealing with an epidemic of typhoid fever, and after investigation finds the source of the trouble an infected milk supply. In this epidemic our labors were of some result, and we were enabled to remove promptly a source of infection. Heretofore, in the great majority of the investigations that were made to trace the source of infection in this disease, our labors generally ceased when we reached the milk contractor, and for this reason. Tracing back any particular supply of milk, when we reached the contractor, he presented us with a list of two or three hundred farms, that we might examine as a possible source of infection these farms extending over New England. This, of course, ended our investigations for that particular supply of milk. However, these investigations were not barren entirely of results; for we had the satisfaction of knowing that the patients afflicted with this disease and the persons employed in the delivery of the milk that came under our jurisdiction were living and acting under good sanitary conditions, and this in itself amply repaid the labor and time devoted to this trouble.

Before speaking of this specific epidemic, I think it would be of interest to the members of this Association to acquaint them with the methods of the Boston Board of Health in dealing with this disease. When a case is reported by the attending physician, an inspector is detailed to investigate the sanitary condition of the premises where the disease exists. This consists in the examination of the drainage, plumbing, ventilation, whether or not well water is used, and, if so, an examination of that particular well, and especially the source of the milk supply. All these conditions are noted, and a written report made and filed at the office for reference.

About ten days ago our attention was called to this particular epidemic. As a result of our usual investigation, it was noticed that in

a certain section of the city 3 cases were reported in one day and the source of the milk supply was the same. These cases were investigated. Sanitary conditions of the patients' homes and surroundings were found in good condition. Next day 4 more cases reported; and up to the present time 26 cases have been investigated, and in all probability due to the same infection,— namely, the milk supply. All these patients obtain their milk from one dealer, and a visit was made to his plant. Here nothing was found but an ideal sanitary condition,— no sickness in the family or among the employees, a clean, wholesome stable, well drained and ventilated, supplied with city water, no well on the premises, milk-room also in good sanitary condition, floor clean, utensils for the care and handling of milk in a clean condition, such as we expect and demand from people in Boston that are engaged in the handling of milk.

Pursuing our investigations further, we were very fortunate to find that the supply of milk, which at that time was under strong suspicion of being the cause of infection, was obtained from a neighboring farm, about ten miles from Boston. This in itself was a source of satisfaction, as heretofore, as I have said above, our investigations generally ended when we reached the milk contractor. A visit was made to this farm the following day, and these conditions found: —

Previous history: Neighbors say that a boy died at this farm two years ago of typhoid fever. This statement denied by the father. Cause of boy's death, indeterminate. Last summer 2 boys sick with typhoid fever. Father says that they had slow fever.

Present history: Wife sick in bed one week. History: a sickness of four weeks' duration, diarrhœa three weeks ago, patient, up to the time of taking to bed, engaged in the preparation and care of milk, care of the cans and receptacles.

Examination of premises: On outside of house, large placard marked typhoid fever. House placarded one week before death of patient. Drainage from house on surface. Rear of house, barn, to this attached out-house, underneath barn cellar, afloat, two feet of water. Farmer acknowledges conditions to have existed for the last two years. Well about fifteen feet from house and barn. In the opinion of inmates, water from this particular well not fit for drinking purposes, only used for cooking and washing. The boy admits that

this water was used for cleaning the cans. Examination of water — much odor, dark color — confirmed the opinion of householders that it is not fit for drinking purposes, and also would add not fit for cleaning purposes, especially milk-cans. No sample, as, in our opinion, analysis unnecessary.

Gentlemen of this Association, I do not think that it requires any further evidence to convince you from the conditions I have described that in all probability these 28 cases of typhoid fever that we have at the present time owe their origin, in all probability, to this infected farm. Of course, the Health Department of Boston have no jurisdiction as regards the sanitary conditions on any farm outside the city; but we can, as we did in this particular case, forbid and prevent the bringing of milk to Boston from any infected farm.

Such, in brief, is a history of an epidemic that is the source of much anxiety to us at the present time. That the source of this infection was found and cut off so quickly is a measure of much satisfaction to our department, and, I am sure, also to a great number of innocent people that probably would have been infected without this summary action. The history of this case is one of great importance to this Association, and many lessons can and should be learned from its recital. Milk, in my opinion, should not be allowed to be sold from an infected farm, as was done in this case for a week after official notice was given to the proper authorities of the town. It is a duty that, as health officials, we owe to the public to prevent and forbid the sale of milk coming from an infected farm. It is only just to declare that milk from such a source should be declared unfit for use until it is certified by a competent health official that the danger of infection is past. Boards of health in the country can be of inestimable value as a protector and guard of a city's milk supply. The care of the water, examination at frequent intervals of the dairies, prompt investigation of any sickness and the cause thereof,— these and many more that I might enumerate would be of great importance. As a health officer, I find that these outbreaks of typhoid fever that we deal with in a large city like Boston, in the great majority of these cases, can be charged to infected milk. The milk supply of a city has been for a great number of years under strong suspicion, and justly so, in my opinion, for the greater number of cases of typhoid.

A city such as we have here in Boston, well sewered, with a water supply that is above suspicion, should not be dealing with epidemics of typhoid fever. It is for you, gentlemen, by your rules and regulations that you are able to make and have the authority to enforce, to declare that typhoid fever is a preventible disease, and as such should be stamped out.

DR. WOODWORTH.— Mr. Chairman, I should like to ask Dr. Durgin a question. Should his views, just expressed, be generally adopted by the members of the Association, and provided that it was left to the judgment of each individual board to prescribe the allotted time that infectious diseases should be quarantined, how should we arrive at a uniform system by which to regulate the matter of quarantine? I understood that the one idea was for members of the State and various boards of the State to adopt a uniform system by which one board should not hold their infectious cases a much longer time than another; that, should any board hold their infectious cases or quarantine victims a time they deem sufficient to stamp out the disease, they should not be subjected to criticism or be told by the family or attending physician that there was no necessity of their holding them so long, that it was not necessary, that they need only have held them ten or fifteen days instead of three or four weeks, that neighboring town boards did not do it, and that the shorter time would do just as well. It seems to me that there are objections to the doctor's method of leaving this matter, and that, if we are to get good results or have a uniform system, we certainly cannot allow that each board may determine the length of time that the infectious cases should be held in quarantine. Perhaps the doctor can explain, so that we will understand it better.

DR. DURGIN.— If I did not make myself clear, I shall be glad to do so. My criticism is: first, that we have no standard; second, that some of us might use an extreme limit, which would be unjust in detaining convalescents from infectious diseases. It is a fact that there is no uniform standard adopted by the boards of health of this or any other State that I know of. There is a great variety of opinion as to how long we should hold patients or suspects. Now, then, if I were to make a suggestion as to getting a standard by which we should all work, it might be done through a committee of

the Association, who might consider the valuable data in Dr. Cutler's paper, and report at some future meeting what would be a reasonable time for us to agree upon for the official observation and detention periods for infectious diseases. I should be glad to see such a thing done.

THE PRESIDENT.—I hope Dr. Durgin will understand that he has made a motion, for it seems to me that it is the only possible way in which this matter can ever be settled; and I shall assume that he has made a motion. I should like to say, before putting the motion, however, that the laws of the State may possibly help us in a certain direction. The original statute which established the State Board of Health provided that that board should have, in case of epidemic disease, co-ordinate power with the various local boards of health of this Commonwealth. The State Board of Health has exercised that power but once in the whole course of its existence. The matter, however, has been considered at various times by the board; and, if this Association chooses to establish a committee, the State Board of Health would contribute with great willingness any of its officers to the consideration of that purpose, and I should offer up Dr. Abbott at once as a sacrifice. I know that he has considered the matter very thoroughly. If I can understand that Dr. Durgin has made a motion — in fact, I know he has — that a committee of five be appointed on behalf of this Association to consider this question, I will put that motion.

The motion was seconded.

THE PRESIDENT.—Is it your pleasure that a committee of five be appointed by this Association to consider this matter? If so, you will please signify it by saying ay: contrary-minded, no. (The motion was adopted.) How shall that committee be appointed?

VOICES.—Chair.

THE PRESIDENT.—If you will allow me, then, I will consider the matter and make up the committee later.

DR. MILLER.— Mr. Chairman, I was very much interested in the second paper, because the gentleman described a case so closely that I think I know the parties and think I saw the location yesterday.

It seems to me that in that case there ought to be some way by which something more can be done. He described 26 cases of typhoid fever, I understood him, traceable to the carelessness of one man, who keeps six cows; and the Boston Board of Health only had power to find out where that source came from. They have no power to make that man clean up his premises or to make a change; they simply have power to prohibit the milk from coming into Boston. But there is, so far, nothing to prevent him from selling that milk elsewhere; and, if he would leave his premises in that condition for two years, there is no probability, unless some greater pressure is brought to bear upon him, that he will clean up the premises now. It seems to me that there ought to be some law by which the State Board of Health, independent of the local board, can straighten out those cases; and I would like to ask for a committee similar to the committee that has just been voted — or the same committee, for instance, will do — to take this matter in to consideration, and see if in cases like that mentioned by the last paper we cannot have some law by which power can be brought to bear upon men of that stamp to compel them to clean up their premises. It is a fact known by a good many that the premises have been in the condition described for a long time. I don't think the writer of the paper has put it on near as thick as it will warrant. I passed by the premises yesterday. It seems that we ought to have some means of straightening up those cases. In that case there is no regular board of health, if I am not mistaken in the locality; but the Board of Health consists of the selectmen, who, as a rule, are so anxious for votes at the next March meeting that they don't like to disturb anybody. Compelling them to clean up the premises might lose a vote. I will recommend that that committee take that matter in consideration. I make that as a motion, Mr. President.

THE PRESIDENT.— I put this motion very reluctantly, gentlemen, because it seems a reflection upon the intelligence of this Association. I should like to say, before putting that, that the power is absolute, of course, in the local boards of health. There is absolutely no power in the State Board to interfere in a matter of this sort; but there is absolute power in every local board of every town in this Commonwealth to stop just these things.

DR. MILLER.— Suppose your local board is dead?

THE PRESIDENT.— Well, I don't think any one of us wants to believe that self-government has come to an end in Massachusetts. Dr. Durgin suggests that we ought to have a wake. You have heard the motion of Dr. Miller, that this committee which is to be appointed be empowered to consider the question of a further regulation of the dairies of the Commonwealth. Is it your pleasure that that matter be referred to the committee? Is there anything to be said upon that motion?

DR. DURGIN.— I recognize the position and the feelings of our friend who makes this motion; but there has been one long and patient effort made in this Association to cause all of the boards of health of this State to make, adopt, and enforce milk regulations. There was an obstacle encountered on the hill here in Boston; and none of the boards, except that of Boston, can legally utilize the milk inspectors. We were able in Boston to put those regulations in force. I believe, however, that every board in this State can make and enforce regulations enough concerning the milk supply to handle all such cases as those which were found in the town of Needham. I doubt about any town gaining aid from outside; that is, any material or legal aid. We are all ready to lend every moral aid that is possible, but I doubt about a town securing aid outside of its own borders. If it has a board of health which is asleep, there should be some means by which the town or its board may be woke up. I should be sorry to see such a subject referred to the committee which has been suggested, and I hope that the motion will not prevail.

DR. CHAPIN (Springfield).— Mr. President, it has been my fortune to investigate milk farms at least a dozen times in the last four or five years. I have found no difficulty whatever in carrying the moral authority of the Springfield Board of Health even into the State of Connecticut, by the simple expedient of saying, "Well, we suspect this milk, and we really don't want to distribute it in our town; but, if you can do so and so, it will be all right." It has always been done so and so, and my authority is recognized in the towns of Suffield and Granby in Connecticut just as much as it is in Springfield. I don't think we need anything more than the moral weight of our Massachusetts laws.

DR. MILLER.— Mr. Chairman, it may seem a little outside for me to make that suggestion; but here are 26 cases of typhoid fever in the city of Boston, and the city has no remedy, you might say, simply it has now prohibited the milk from going into Boston. It seems to me too bad that the city of Boston should thus suffer. 26 cases, and we know not what more may follow, and yet have so slight a remedy. It seems to me that there ought to be some power by which the community could be protected more thoroughly than they are in a place of that kind. Many of you know that there are many small towns, as I suggested some time since, where the only board of health is the selectmen; and in the majority of cases they are not very efficient, so there seems to be a weak point, and it would seem as though we ought to have some power by which those cases can be regulated.

DR. WOODWORTH.— Mr. Chairman, at Fitchburg we had something of the same experience some time ago; and, of certain farms that we inspected, but one man refused to comply with the request that was made. Inasmuch as these farms were in adjoining towns, and this one refused absolutely to do as was requested, he was prohibited from selling his milk in the town; and the milkman was informed that he could not bring that milk into the city, and he does not. We simply informed him that, unless he complied with the regulations of the board, we should not buy milk of him; and his milk has been refused, not allowed to be brought into the city. In all the others it was simply, as Dr. Chapin has said, that, if they would fix up, there would be no trouble, and they could bring up their milk as usual or sell it to the milkmen; and all but one complied. This one case of refusal is the only one we have had, and I think it is the only one in forty or fifty farms. This case occurred in the last seven.

A MEMBER.— I suppose he went to making butter, didn't he?

DR. WOODWORTH.— I cannot tell you what he is doing now.

DR. MILLER.— Mr. President, allow me one more say on this point. In this case that we are discussing, undoubtedly if the milk from these six cows had been sold into the town, something would have been done, the farm would have been investigated and things cleaned up; but, as that milk farm is pretty well one side and the milk went to Boston, nobody felt any particular interest — at least,

our local authorities felt no particular interest — in paying any attention to it. It was not sold in the town. Milk dealers there had nothing to do with it. The milk went to Boston. Consequently, it was none of their business. It was not their wash.

MR. PILSBURY.— I should like to ask if there were any cases of typhoid fever in this town, and, if so, and they put up the cards, what they did about seeking for the source of contagion?

DR. MILLER.— I think nothing yet.

MR. PILSBURY.— It is time they did.

MR. JORDAN.— Isn't there a case of typhoid fever, or wasn't there one, right directly opposite this house, right on the opposite side of the street?

DR. MILLER.— Yes.

MR. JORDAN.— Used this same milk?

DR. MILLER.— I don't know about that.

DR. DURGIN.—It may be a bit of satisfaction to know that, when these cases are detected, and the milk from these farms is cut off, it has the most delightful quickening effect on the farmer that you ever saw. It has been so in these late instances. They get about their work, clean up the barn; and they are very anxious for advice, and do whatever you tell them. In one of these instances the cows were removed at once from the farm. All of the cans and utensils used in the care of milk were thoroughly disinfected at once, and the place thoroughly cleaned up; and, when this had been performed to the satisfaction of our own officers, then this milk will be readmitted into Boston. Meantime the farmer is losing money.

THE PRESIDENT. — Is there anything else to be said upon this interesting subject? If not, is there any other business to be brought before the Association at this time?

DR. MILLER.— Mr. Chairman, I should like to ask a question. There were remarks made by the second speaker as to some of the diseases, so-called children's diseases. He spoke in the institution where he was of the effort they made in stamping out certain diseases. Take, for instance, measles and mumps for illustration. Suppose that in a town (not in a school), but in a town, isolated community, those diseases are mild, quite mild. Would it be advisable, in the opinion of the medical men, to make an effort to stamp them

out, or let them run the course, as they usually do? I thought of it when the gentleman was speaking. I merely asked, so as to get the opinion of the gentlemen present. I know it is quite common in many places not to make any effort, where those diseases are running mild, to stamp them out, but to let them run, and look after the children. In many cases they are so mild that the children are not kept indoors at all except in stormy weather, in other cases only a day or two.

THE PRESIDENT.— Dr. Prescott.

DR. PRESCOTT.— I believe in trying to limit an epidemic of measles or mumps as much as possible, no matter how light the cases may be, because there is no knowing how soon in an epidemic where the cases have been light the cases may become severe and many patients die. I should say, Always limit the cases as much as possible, take just the same care with an epidemic of light cases as with an epidemic of severe ones.

MR. WHITAKER.— Mr. President, on this matter of milk supply, information has come to me of a milk inspector in a New England city who has a policy which is excellent, though it would not apply in Boston. He makes occasional inspections of out-of-town herds of cows supplying his city with milk. When he finds the conditions are bad, he reports it to the mayor, and the report is presented at the next meeting of the city government and ordered printed, and the publicity of that in the local papers remedies the evil in a short time.

THE PRESIDENT.— Is there anything else to come before the Association at this time before we adjourn? Before that motion is put, however, I will name the committee for the consideration of the rules with regard to infectious diseases: Dr. Durgin, Dr. Abbott, Dr. Chapin, Dr. Darling, and Mr. Coffey, of Worcester.

MR. BRIMBLECOM.— Mr. President, I am sure we all appreciate the hospitality of the Boston Board which has been shown to us this afternoon; and I move that a vote of thanks be extended to them for their courtesy to the Association.

The motion was seconded.

THE PRESIDENT.— You have heard the motion. It alludes to something which has become so much a matter of fact here that I am

afraid the Association does occasionally forget the very great debt that we are under to the city of Boston. It shows us all good things, in the first place, in a sanitary way; and it provides us with all good things for our bodily support and entertainment here. I will ask you, then, to assent to the vote by a rising vote.

The vote of thanks was adopted, all the members rising in its support. The Association then adjourned.

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